Technical Correspondence

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G5RV Antenna

The G5RV is a popular recipe for a centre fed aerial but, how many are true to type?

The best available theoretical analysis of the G5RV is the paper by our own master engineer VK1DK published in the January 1989 issue of "AR". That paper shows that the G5RV is a mediocre, compromise broadband aerial. If a particular installation does not behave according to theory, I suggest it is worse than mediocre.

The design depends on a "matching section" behaving as a balanced feeder with properties predictable by transmission line theory. If the system, matching section plus aerial, is unbalanced, the behaviour is unpredictable and no amount of tinkering with "choke baluns", "candlebra baluns" or any other misnamed multi-inductor will restore balance.

Most backyard G5RV aerials will be unbalanced for reasons given in the text books. An inverted "V" version will be unbalanced wherever it is located. If your pride and joy is getting results it might not be because it is behaving as a G5RV should.

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The current at any point on a balanced feeder conductor is equal in magnitude and opposite in phase to the current at the corresponding point on the other conductor. It follows that the voltages with respect to earth at corresponding points are also equal and opposite in phase. Similarly, the currents and voltages with regard to earth on corresponding points on the aerial conductors are also equal and opposite in phase.

Balance can and should be checked before pronouncing a G5RV recipe true to type. Current magnitudes can be measured with a current sensor similar to the toroids used in SWR meters. (An interesting but rather complex sensor is described by G5HMO in the June and July '92 issues of "Radio Communication".)

Check that current maxima or minima occur at corresponding points on the matching section conductors. It is not necessary to check phase. The measurements must be made with the whole installation in its final operating position.

Don VK1DK, in his January '89 article, suggests there might be a better length for the matching section (and aerial?). Apparently others have investigated that possibility and some results are published in "Radio Communication — Technical Topics" of January '93. Also in that "TT" is a report about experiments with "choke baluns" similar to the VK6BIL version report in December '92 "Random Radiators". From my knowledge of first principles, I can't support some of the claims made for those devices.